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## Science and Weapons Daily Review

Wednesday
6 June 1984

Secret

SW SWDR 84-109 6 June 1984

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## Science and Weapons Daily Review

USSR: THERMOMECHANICAL TREATMENT USED TO IMPROVE STRENGTH OF WELDED STRUCTURES

In a recently published article in a Soviet journal, B. Ye. Paton, Director of the Paton Electric Welding Institute, and others address problems with the joints of welded structures. The joints typically are lower in strength than the metal being welded. The authors stated that the strength of a welded aluminum structure was significantly increased by using a specific thermomechanical treatment (TMT).

## Comment:

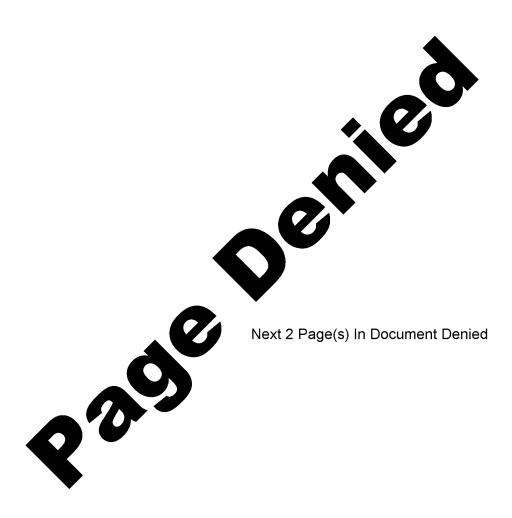
We believe that TMT will become a major Soviet technique for improving metal alloy properties. TMT combines heat treatment and mechanical deformation to produce modifications in alloy microstructures. Physical properties of alloys such as strength, toughness, and wear resistance are determined by the microstructures. TMT has been used with steels and with aluminum, titanium, and nickel alloys.

By using TMT, the Soviets can optimize the properties of an alloy for a particular use. TMT also will allow the Soviets to extend the applicability of existing materials. There are several TMT processes that vary both in the mechanical deformation temperature and in the heat treatments used. One of the processes, called preliminary TMT (PTMT), can be done with equipment currently available in many plants. PTMT reportedly has increased the ultimate strength of aluminum alloys up to 40 percent. A major advantage of TMT is that no major retraining of the Soviet workforce is

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25 <b>X</b> 1	SECRET	
25 <b>X</b> 1	a skilled workforce nd use of new	necessary because heat treatment and are standard techniques. The lack of has hampered the Soviet development a materials, such as powdered metals an

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